

AMENDMENTS TO THE CLAIMS

Please **CANCEL** claims 8, 41-44 without prejudice or disclaimer.

Please **AMEND** claims 1-7, 9-40 as shown below.

The following is a complete list of all claims in this application.

- 1.) (Amended) Carbon foam comprising: A semi-crystalline, largely isotropic, carbon foam

an open-celled structure produced by heating ~~produced from particulate~~ high volatile bituminous coal particles ~~exhibiting a free swell index of between about 3.5 and about 5.0 and of a small diameter in a pressure controlled reactor above about 300°C, under a pressurized non-oxidizing atmosphere having a pressure from about 50 to about 500 psi, wherein said carbon foam having has a density of between~~ ranging from about 0.1 ~~and to~~ about 0.8 g/cm³ g/cm³ ~~and a thermal conductivity below about 1 W/m²K.~~
- 2.) (Amended) The carbon foam of claim 1 wherein said coal exhibits a free swell index ~~of between~~ ranging from about 3.75 3.5 to and about 4.5 5.0.
- 3.) (Amended) The carbon foam of claim 2 having a compressive strength below about 6000 psi.
- 4.) (Amended) The carbon foam of claim 2 that has been carbonized.
- 5.) (Amended) The carbon foam of claim 2 that has been graphitized.

- 6.) (Amended) A method for producing a carbon foam from a high volatile bituminous coal ~~exhibiting a free swell index of between about 3.5 and about 5.0~~ comprising:
- A) ~~comminuting said high volatile bituminous coal to a small particle size to form a ground coal;~~
 - B) placing high volatile bituminous coal particles in a pressure controlled ~~said ground coal in a mold; and~~
 - C) heating said high volatile bituminous coal particles in said mold under a pressurized non-oxidizing atmosphere ranging from about 50 to about 500 psi to a temperature of between ranging from about 300° C and to about 700° C and ~~soaking at this temperature for a period of from about 10 minutes to about 12 hours to form a perform; and~~
 - D) ~~controllably cooling said perform.~~
- 7.) (Amended) The method of claim 6 wherein said high volatile bituminous coal exhibits a free swell index of ~~between~~ ranging from about 3.75 3.5 and to about 4.5 5.0.
- 8.) (Cancelled)
- 9.) (Amended) The method of claim 7 wherein said temperature is achieved using a heat-up rate of ~~between~~ ranging from about 1° C to about 20° C per minute.
- 10.) (Amended) The method of claim 7 wherein said controlled cooling is accomplished at a rate of less than about 10° C/min to a temperature of about 100° C.

- 11.) (Amended) A laminated sheet comprising:
- A) ~~a pair of skins laminated to either side of;~~
 - B) a carbon foam core having a surface of ~~a semi-crystalline, largely isotropic, wherein said carbon foam is~~ produced from particulate high volatile bituminous coal ~~exhibiting a free swell index of between about 3.5 and about 5.0 and of a small diameter, said carbon foam having and has~~ a density of between about 0.1 and about 0.8 g/cm³ ~~and a thermal conductivity below about 1 W/m² K;~~ and
a sheet laminated to said carbon foam surface.
- 12.) (Amended) The laminated sheet product of claim 11 wherein said coal exhibits a free swell index ~~of between~~ ranging from about ~~3.75 and 3.5~~ to about ~~4.5~~ 5.0.
- 13.) (Amended) The laminated sheet product of claim 12 wherein said skins sheet ~~comprise~~ comprises a material selected from the group consisting of aluminum, steel, polymer sheet, inconel, titanium, refractory metals, fiber reinforced polymer sheet and paper.
- 14.) (Amended) The laminated sheet product of claim 12 wherein said ~~sheet~~ carbon foam core has been carbonized.
- 15.) (Amended) The laminated sheet product of claim 12 wherein said ~~sheet~~ carbon foam core is graphitized.

- 16.) (Amended) ~~The semi-crystalline, largely isotropic,~~ carbon foam of claim 1,
wherein said high volatile bituminous coal contains ~~between~~ from about 35% and
to about 45% by weight of volatile matter.
- 17.) (Amended) ~~The semi-crystalline, largely isotropic,~~ carbon foam of claim 16 1
wherein said high volatile bituminous coal has a Gieseler initial softening
temperature above about 380° C.
- 18.) (Amended) ~~The semi-crystalline, largely isotropic,~~ carbon foam of claim 17
wherein said high volatile bituminous coal has a Gieseler initial softening
temperature ~~between~~ from about 380° C and to about 400° C.
- 19.) (Amended) ~~The semi-crystalline, largely isotropic,~~ carbon foam of claim 16 1,
wherein said high volatile bituminous coal has a plastic range of at least about
50° C.
- 20.) (Amended) ~~The semi-crystalline, largely isotropic,~~ carbon foam of claim 19
wherein said high volatile bituminous coal has a plastic range of from about 75° C
to about 100° C.
- 21.) (Amended) ~~The semi-crystalline, largely isotropic,~~ carbon foam of claim 19 1,
wherein said high volatile bituminous coal has a maximum fluidity of at least
~~several~~ 300 hundred ddpm as determined by ASTM D2639.
- 22.) (Amended) ~~The semi-crystalline, largely isotropic,~~ carbon foam of claim 19 21
wherein said high volatile bituminous coal has a maximum fluidity of more than
2000 ddpm as determined by ASTM D2639.

23.) (Amended) The ~~semi-crystalline, largely isotropic,~~ carbon foam of claim ~~49~~ 1, wherein said high volatile bituminous coal exhibits an expansion of at least about 20% as determined by Arnu dilatation.

24.) (Amended) The ~~semi-crystalline, largely isotropic,~~ carbon foam of claim 23 wherein said high volatile bituminous coal exhibits an expansion of at least about 100% as determined by Arnu dilatation.

25.) (Amended) The ~~semi-crystalline, largely isotropic,~~ carbon foam of claim ~~23~~ 1, wherein said high volatile bituminous coal: ~~1)~~ comprises;

A) from about 50 to about 60% by weight of fixed carbon; and

B) less than about 30% by weight inert maceral material;

2) exhibits a vitrinite reflectance in the range of from about 0.80 and about 0.95 as determined by ASTM D2798; and

3) exhibits 0.0 volume % moderate or severe oxidation as determined by ASTM D2798.

26.) (Amended) The ~~semi-crystalline, largely isotropic,~~ carbon foam of claim 1 having a density of ~~between~~ ranging from about 0.2 g/cm³ and to about 0.6 g/cm³.

27.) (Amended) The ~~semi-crystalline, largely isotropic,~~ carbon foam of claim 1 having a density of ~~between~~ ranging from about 0.3 g/cm³ and to about 0.4 g/cm³.

- 28.) (Amended) The method of claim 6 wherein said high volatile bituminous coal contains ~~between~~ from about 35% ~~and~~ to about 45% by weight of volatile matter.
- 29.) (Amended) The method of claim 28 wherein said high volatile bituminous coal has a Gieseler initial softening temperature above about 380° C.
- 30.) (Amended) The method of claim 29 wherein said high volatile bituminous coal has a Gieseler initial softening temperature ~~between~~ ranging from about 380° C ~~and to~~ about 400° C.
- 31.) (Amended) The method of claim 6 wherein said high volatile bituminous coal has a plastic range of at least about 50° C.
- 32.) (Amended) The method of claim 31 wherein said high volatile bituminous coal has a plastic range of from about 75° C to about 100° C.
- 33.) (Amended) The method of claim 31 wherein said high volatile bituminous coal has a maximum fluidity of at least ~~several~~ 300 hundred ddpm as determined by ASTM D2639.
- 34.) (Amended) The method of claim 31 wherein said high volatile bituminous coal has a maximum fluidity of more than 2000 ddpm as determined by ASTM D2639.
- 35.) (Amended) The method of claim 31 wherein said high volatile bituminous coal exhibits an expansion of at least about 20% as determined by Arnu dilatation.
- 36.) (Amended) The method of claim 35 wherein said high volatile bituminous coal exhibits an expansion of at least about 100% as determined by Arnu dilatation.

37.) (Amended) The method of claim 35 wherein said high volatile bituminous coal:
4) comprises;

A) from about 50 to about 60% by weight of fixed carbon; and

B) less than about 30% by weight inert maceral material;

2) exhibits a vitrinite reflectance in the range of from about 0.80 ~~and~~ to about
0.95 as determined by ASTM D2798; and

3) exhibits 0.0 volume % moderate or severe oxidation as determined by ASTM
D2798.

38.) (Amended) The method of claim 6 wherein said carbon foam has a density of
~~between~~ ranging from about 0.2 g/cm³ ~~and~~ to about 0.6 g/cm³.

39.) (Amended) The method of claim 6 wherein said carbon foam has a density of
~~between~~ ranging from about 0.3 g/cm³ ~~and~~ to about 0.4 g/cm³.

40.) (Previously Added, currently amended) ~~A semi-crystalline, largely isotropic,~~
~~coal-based~~ The carbon foam of claim 1, wherein said carbon foam has ~~having a~~
thermal conductivity below about 1 ~~W/m² K~~ W/m K.

41.) (Cancelled)

42.) (Cancelled)

43.) (Cancelled)

44.) (Cancelled)